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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/625,096

07/22/2003

Norman Herron

PE0696 US NA

8767

23906

7590

07/13/2005

E I DU PONT DE NEMOURS AND COMPANY
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WILMINGTON, DE 19805

EXAMINER

GARRETT, DAWN L

ART UNIT

PAPER NUMBER

1774

DATE MAILED: 07/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/625,096

Applicant(s)

HERRON ET AL.

Examiner

Dawn Garrett

Art Unit

1774

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 April 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) 2-5,7,11,16-19,21,24,30-33,35 and 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,6,8-10,12-15,20,22,23,25-29,34,36,37 and 39-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7-22-03 & 2-4-04 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4-14-2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action is responsive to the amendment dated April 14, 2005. Claims 13-15, 26, 27, 40, and 41 were amended.

2. The objection to claims 13, 14, 26, 27, 40, and 41 set forth in the last Office action, paragraph 2, is withdrawn due to the amendment.

3. The rejection of claims 1, 6, 8, 9, 12-15, 20, 22, 25-27, 29, 34, 36, and 39-41 under 35 U.S.C. 103(a) as being unpatentable over Doi et al. (EP 1138746) is withdrawn over the present species under consideration. Applicant's remarks were persuasive with regard to the failure of Doi et al. to specifically teach hydroxyquinoline as required by the polymer of present claims as a functional group.

4. The examiner has not found prior art to reject the last considered species, which is the following:

- a) conjugated polymer backbone: fluorenediyls
- b) a first-type functional groups: hydroxyquinolines
- c) a first-type inert spacer groups: aromatic; and
- d) a metal species: Iridium

No second-type functional group is present in the species selected.

5. The examiner has identified prior art that reads upon applicant's first elected species. A rejection over that prior art is set forth in this Office action. Applicant's first elected species is the species now under consideration again. The prior statement in the last Office action that this species is allowable is now withdrawn.

Art Unit: 1774

The first species elected by applicant is the following:

- a) conjugated polymer backbone: fluorenediyls
- b) a first-type functional groups: beta-dicarbonyls
- c) a first-type inert spacer groups: alkyl; and
- d) a metal species: Iridium

No second-type functional group is present in the species selected.

Applicant previously indicated claims 1, 6, 8, 9, 10, 12-15, 20, 22, 23, 25-29, 34, 36, 37, 39, 40, and 41 read on this species. Claims 2-5, 7, 11, 16-19, 21, 24, 30-33, 35, and 38 are withdrawn as non-elected at this time.

Drawings/Specification

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: Each individual figure shown in the drawings is not set forth in the "Description of Drawings" section (which should be labeled "**Brief Description of Drawings**") or specifically mentioned in the specification. The Office considers each of Figures 1A, 1B, 2A, 2B, 2C, 2D, 2E, 2F, 3A, 3B, 3C, 3D, 4, 5, 6A, 6B, 7, 8A, 8B, 8C, 8D, 8E, 9A, 9B, 9C, 9D, 9E, 10, 11A, 11B, 11C, 12A, 12B, 13, 14, 15, and 16 to be a separate figure. Each of these drawings should be described/mentioned independently in the specification. For example, the description of "Figure 1" in the "Description of Drawings" section is not sufficient to describe individual drawings 1A and 1B. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any

Art Unit: 1774

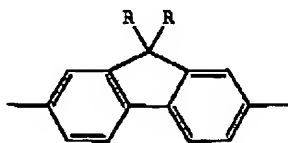
amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

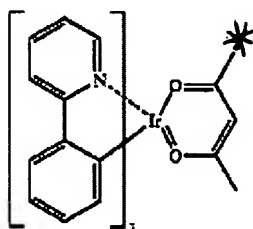
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1, 6, 8, 9, 10, 12-15, 20, 22, 23, 25-29, 34, 36, 37, 39, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tokito et al. (US 2003/0091862 A1). Tokito et al. discloses polymeric phosphorescent compositions (see abstract). The polymeric material disclosed by Tokito et al. may comprise a fluorene divalent group substituted with a substituent as part of a polymer of which a main chain is a conjugate system (see par. 92-94) per the "conjugated polymer backbone". These divalent groups are taught as incorporated into the main chain of the polymer (see par. 94). The fluorene divalent group is the following (from par. 93):



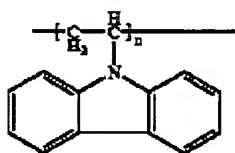
Art Unit: 1774

The R groups of the above formula may include alkyl groups (see par. 94) per the “first-type inert spacer group”. A beta-dicarbonyl per the “first-type functional group” may bond to the R groups (see par. 97 and 98). The beta-dicarbonyl complexes with a metal such as iridium (per the “metal”) that is further complexed to a ligand (per claims 14, 27, and 41) (see par. 97). For example:



“wherein * marks in the chemical formula denote portions (bonds) connecting to substituents R shown in the chemical formulas of the polymer”.

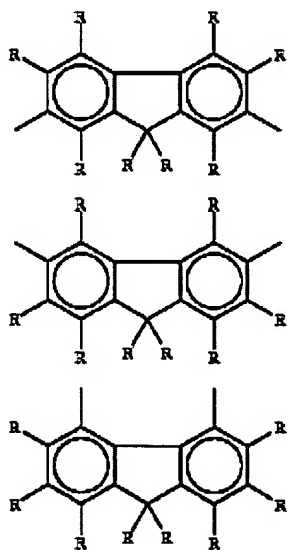
With regard to claim 9, Tokito et al. teaches carbazole units that may be repeating units of the polymeric chain (see par. 90 and page 8, P4):



Although Tokito et al. fails to exemplify a polymer according to the selected species, in view of the teachings of each required component including the polymeric backbone, first-type functional group, first-type inert spacer group, and metal complex, it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed a polymer according to the present species, because Tokito et al. teaches all the required individual components of the polymer.

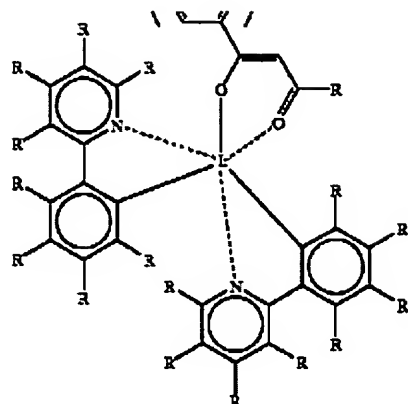
Art Unit: 1774

9. Claims 1, 6, 8, 9, 10, 12-15, 20, 22, 23, 25-29, 34, 36, 37, 39, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikehira et al. (US 2002/0193532). Ikehira et al. discloses a polymeric light emitting substance (see abstract). The conjugated polymeric chain of formula (I) comprises Ar1, which is an arylene group that may be a fluorene group per the “conjugated polymer backbone” (see par. 40, par. 41, and par. 51, page 12, first col., lines 36-38). Ar1 may have substituents “R” such as an alkyl group per the “first-type inert spacer group” (see par. 48).



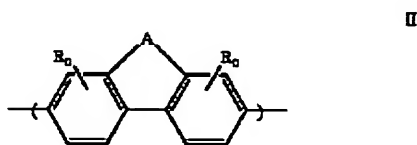
Ikehira et al. further discloses a beta-carbonyl may bond with the polymeric chain repeating unit (the fluorene group). The beta-carbonyl is further complexed to a metal and the metal is complexed with further ligands (see page 8 formulas). The beta-carbonyl reads upon the “first-type functional group”, the metal may be iridium per the metal species, and the further ligands read upon claims 14, 27, and 41. A group shown on page 8 that reads upon the first-type functional group complexes with iridium that is further complexed with ligands is the following:

Art Unit: 1774



Although Ikehira et al. fails to exemplify a polymer comprising the above shown group attached to a polymeric chain wherein the chain comprises the arylene fluorene chain group with R substituents, in view of the teachings of each required component including the polymeric backbone (fluorene), first-type functional group (beta-dicarbonyl), first-type inert spacer group (alkyl), and metal complex (iridium), it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed a polymer according to the present species, because Ikehira et al. teaches all the required individual components of the polymer.

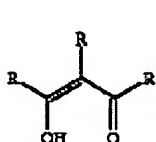
10. Claims 1, 6, 8, 9, 10, 12-15, 20, 22, 23, 25-29, 34, 36, 37, 39, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Marrocco, III et al. (US 2002/0028347 A1; cited by applicant). Marrocco et al. teaches polymer matrix electroluminescent materials and devices (see title). Marrocco et al. teaches a polymer comprising a repeat unit that may be a fluorene group (see claim 1, formula II):



“A” in the formula may be $-CR_1R_2-$ where R1-R4 are alkyl groups (see claim 1, page 15). The fluorene group reads upon the “conjugated polymeric backbone”. The “A” alkyl group reads

Art Unit: 1774

upon the “first-type inert spacer group”. Marrocco et al. discloses one or more luminescent metal ions or luminescent metal ion complexes are in the composition comprising the polymer material (see claim 1). A preferred metal is iridium (see claim 17) per the metal species. A polarizable ligand may include a beta-dicarbonyl (see claim 26, formula 1) per the “first-type functional group”:



The polarizable ligand may be part of the polymer chain (see claim 27, page 17). Further ligands such as bipyridines are taught to complex with the metal (see par. 33) per claims 14, 27, and 41.

Although Morrocco et al. fails to exemplify a polymer according to the selected species, in view of the teachings of each required component including the polymeric backbone, first-type functional group, first-type inert spacer group, and metal complex, it would have been obvious to one of ordinary skill in the art at the time of the invention to have formed a polymer according to the present species, because Morrocco et al. teaches all the required individual components of the polymer.

Response to Arguments

11. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dawn Garrett whose telephone number is (571)272-1523. The examiner can normally be reached Monday through Friday.

Art Unit: 1774

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached at (571) 272-3186. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Dawn Garrett
Primary Examiner
Art Unit 1774

D.G.
July 2, 2005